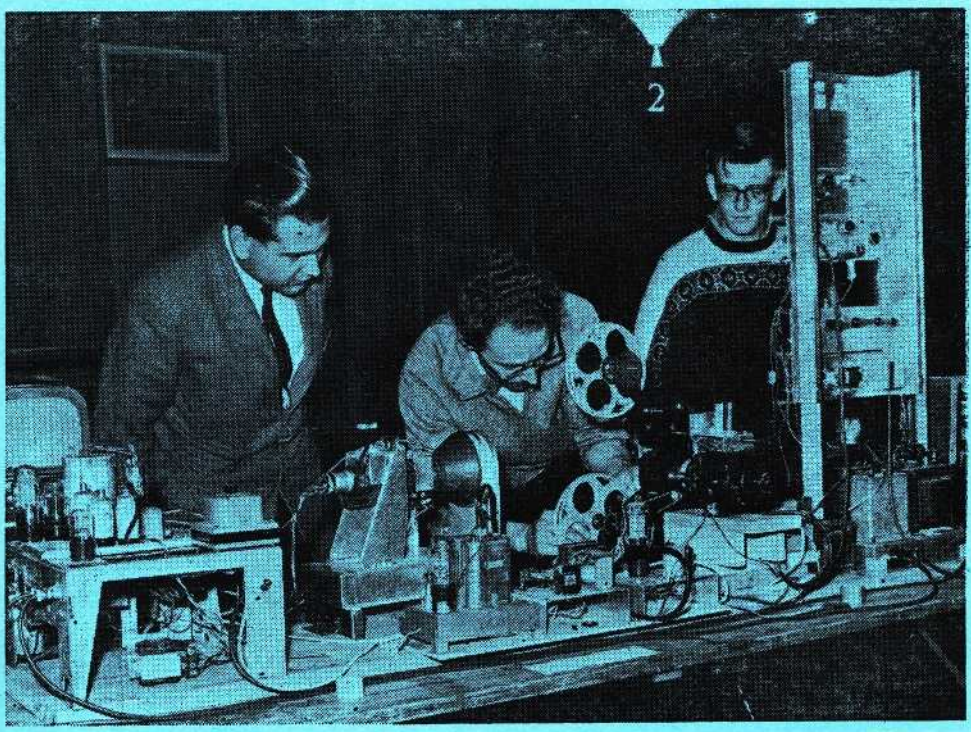

CONVENTION 1960

CQ-TV

No. 44

THE BRITISH AMATEUR TELEVISION CLUB

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Above, left to right, Grant Dixon and Don Reid looking at John Tanner's new Vidicon camera.

Right, 'Fluff' Plowman adjusts his slow scan rack. Top unit is the slow scan monitor, below it the photocell, amplifier and subcarrier generator, and bottom the scan generators and scanner tube.

Editorial and reports.

As briefly mentioned on the newsletter sent out just before Christmas John Tanner has been away from Bristol until recently, and CQ-TV has been sadly neglected. However, all is now back to normal and future editions should be out on time. This delay with CQ-TV 44 has prevented the convention being reported before, and as it is now some four months since the event, this is only going to be a skeleton report. However, a duplicated sheet is available on request from the Secretary with a full write up. Since the B.A.T.C. Convention two new records have been set up, and B.A.T.C. has been represented at the R.S.G.B. Convention in Cambridge, and at the Radio Hobbies Exhibition.

Convention.

The 1960 Convention showed a clear advance in video equipment with many cameras on show. Mostly Vidicon types although there were two Image Orthicon, an Iconoscope and an excellent Monoscope by Graham Hill (Circuit in this edition). Pulse equipment was included with most camera channels, although Roy Martyr's 405 line sync generator is worth of special mention. This uses binary dividers and generates splendid pulses, as well as a series of test waveforms. Colour was only represented by Bill Hipwell's colour bar generator on N.T.S.C. standards. Grant Dixon, Pluff Plowman and Gordon Sharpley all showed slow scan equipment, (see photograph of G3AST) Telecine equipment was shown by Bob Tebbutt (front cover picture) with an adapted 9.5mm projector for flying spot scanning, and a Vidicon telecine attachment to the MARS camera from Birmingham.
Vidicon telecine attachment to the Midland Amateur Radio Society camera.

R.S.G.B. Convention

Ian Waters (G3KKD/T) organised the B.A.T.C. demonstration which was the transmission of a half hour 'programme' from G3NOX/T - Jeremy Royle. At the Saffron Walden station G3NOX/T three cameras were run into Jeremy's vision mixer, together with Jeremy's Monoscope. John Jull and Ian Waters supplied the two two additional cameras. Ian Waters appeared on the screens of two 27" monitors kindly loaned by a local firm, and described aims and activities of the club and the East Anglia set up. Apart from the pulse gen erator losing mains lock for a few seconds all went well, and the vision and sound on 70cms were received with excellent results some 12 miles from the transmitter in the centre of Cambridge. A report received later showed that the programme was received by G3OAT/T 20 miles further on. An excellent effort by the East Anglia members of the club.

Finally, the two records set up by G2WJ/T and G3OAT/T and by the joint efforts of G3KKD/T, G3NOX/T, G2WJ/T and G3GDR.

First, in November G2WJ/T sent pictures over 49 miles to G3OAT/T. Ralph Royle, in Dunmow sent pictures on 625 lines to Mike Bryett near Huntingdon. The Tx used a QQV06-40, and is the one that has been in use at G2WJ/T for several years, and the receiver used a simple convertor with an R.F. amplifier. More details later of the equipment.

The second record is the transmission, and relay of pictures from G3KKD/T, through G3NOX/T, and then through G2WJ/T to G3GDR at Abbott's Langley, Hertfordshire - a distance of 80 miles. Space is limited in this edition, and a further report will be included in CQ-TV 45.

Slow Scan may be transmitted on 70 cms, but on no other bands at present. Discussions are under way to extend the bands available for this system, and progress will be reported in CQ-TV, or on newsletters.

John Tanner - G3NDT/T

35mm Microfilms of CQ-TV

There are now four microfilms of back copies of CQ-TV ; these comprise issues 1 to 10, 11 to 20, 21 to 30 and 31 to 40 respectively. The price is 10/- for any set of ten back issues. Orders should be sent to the Chairman : C.G.Dixon, Kyrle's Cross, Peterstow, Ross-on-Wye Herefordshire. U.S.A. and Canadian members please send $2 per set of ten back issues.

931a. There are several 931a cells available to club members at £2 each. (Note the current price £4 in surplus stores) These are available from John Tanner, and are complete with 11 pin base.

Staticon tubes now available to U.K. members at £10 each. These are tubes without coils.

Vidicon tubes complete with coils (scan & focus) £25 each.

All enquiries about camera tubes to Don Reid.

5527 Iconoscope for sale - Offers please to John Tanner.

Good 14" TV sets £5 each. Scrap 9" and 12" sets for 10/- Ideal for components & valves. J. Tanner.

Items for exchange or for sale to

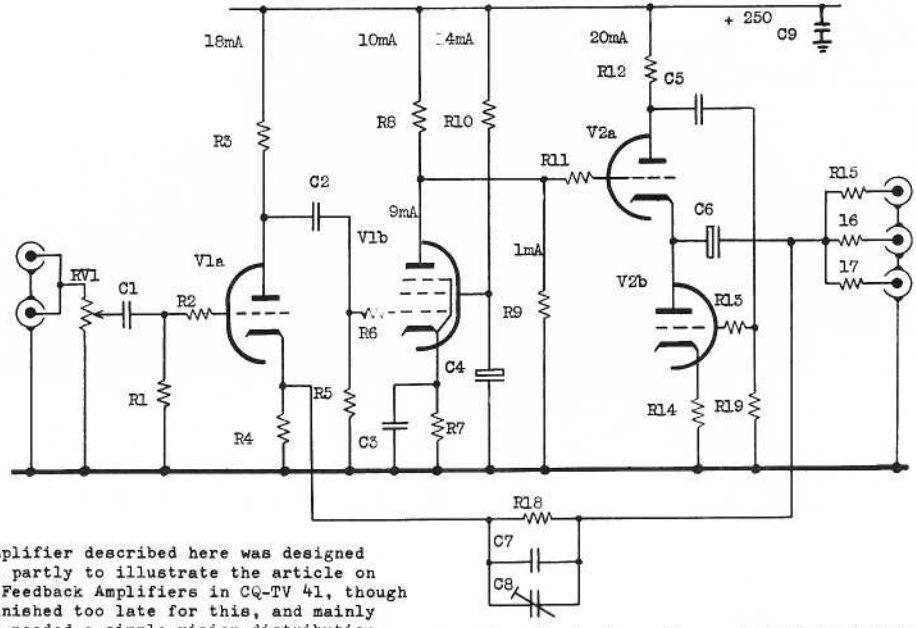
Members may advertise items for exchange or for sale in CQ-TV free of charge. Details to Don Reid please.

Transformer for sale mentioned in What the other chap is doing - D. Marshall, Harpenden. Weight about 20 lbs each, price about 15/-, buyer to collect.

Odd Snippet.

F. Gregory, 56 Queens Road, Hersham, Walton-on Thames, Surrey, requires a test card G monoscope - he is willing to exchange for six new 931A photomultipliers.

A DISTRIBUTION AMPLIFIER



The amplifier described here was designed and built partly to illustrate the article on Negative Feedback Amplifiers in CQ-TV 41, though it was finished too late for this, and mainly because I needed a simple vision distribution amplifier. I will describe the design technique fairly fully to account for the component values.

Reference to the circuit diagram will reveal that this two valve circuit is a simple feedback triple consisting of the triode half of a 6U8 triode-pentode, a pentode amplifier (the other half of the 6U8) and a shunt-regulated cathode follower as the output stage, with feedback from the common output point to the first cathode. Don't let the shunt-regulated stage frighten you - it is merely a cathode follower (the upper valve, V2a) whose current is sampled by the extra anode resistor R12 and fed to the grid of the lower valve, V2b, which amplifies it. Thus both valves operate effectively in parallel as far as current flowing in the load is concerned, although they are in series for D.C. The load current thus regulates the part of the signal current supplied by V2b ; since the amount of work done by V2b depends on the load current and not on the load voltage, it is quite insensitive to stray capacitance, and so behaves as an output stage with low output impedance. The stage is a bit like the push-pull output stage in audio, because the signals supplied by the two stages add, but distortions due to non-linearity, etc., cancel to a large extent ; the stage can deliver about twice the current of an ordinary cathode follower, but with much less non-linearity.

Now the design : it was decided to try and obtain three well-isolated 75Ω outputs from one 12BH7, reference to the valve curves having shown this to be possible using the BATC standard +250 volt H.T. line. Choice of a 6U8 triode-pentode for the other two stages made possible a compact layout. Since we want to present a reasonable approximation to a correct 75Ω sending end termination at the output, we will need a low output impedance at the output point of the amplifier proper. This means lots of feedback, and 6dB gain at least in the amplifier to make up for the loss in the output resistors R15, R16 and R17. We also want as few electrolytics as possible because of their bulk and to avoid L.F. troubles. This means running the valves direct from the H.T. line without any decoupling, but since there is to be plenty of feedback we can probably manage this.

First select a reasonable operating point for the first triode. This is quite a hefty bottle, and with 1 volt bias about will sit quite happily with +150 volts on the anode and 18 mA anode current, when it will have a g_m of 8·5. We need a fairly large anode current here because we want a small cathode resistor to get high gain and good H.F. response. This means we must drop 100V in the anode load, so we need an 8·2K anode load and a 56Ω cathode resistor to give the necessary

bias. In this case we have designed for particular D.C. conditions and must accept what gain we can get. Since the gain A is given by

$$A = \frac{\mu R_1}{r_a + R_1 + (\mu+1)R_k}$$

where R_1 is the anode load, R_k the cathode resistor, and μ and r_a the usual valve parameters, and for this triode $\mu = 40$, $R_1 = 8{\cdot}2K$, $r_a = 5K$, $R_k = 0{\cdot}056K$, we have gain = about 20 times, or 26dB. We put this aside for a moment and tackle the pentode stage. By a similar reasoning we arrive at our values for the pentode stage, and find we have a gain of about 50 times, or 33dB. In this case our design was dictated by the overriding consideration that the "hot" side of the output electrolytic should be about half way up to H.T. i.e. about 125 volts. Hence the upper grid of the 12BH7 should be about 120 volts. This is D.C. coupled to the previous anode, so this fixes our anode voltage for the pentode. A D.C. coupling here is almost a "must" to avoid L.F. instability; in general a feedback amplifier can go into L.F. oscillation if there are more than two RC couplings to contribute phase shift at low frequencies and turn the feedback positive. Our design has a coupling C2R5 with a 1 second time constant ; the output coupling C6 feeding R15, R16 and R17 and their 75Ω lines in parallel with R18 and R4 - this looks like about 40Ω ; 40Ω x 125μF is quite short, so these two time constants are well staggered, which should help to confer stability ; finally there is the screen decoupling electrolytic C4, which has a rather indeterminate action, but if necessary can be corrected for. Note that C5R19 is not included because the signal path through this coupling and V2b is paralleled by a D.C. signal path through V2a.

Now the output stage ; we must obviously come out through a fairly big electrolytic, taking our feedback from the output side to take advantage of the tilt-correcting properties of the feedback. 125μF was about the biggest capacity we could find in a reasonable-sized can. R14 sets the current through both triodes : we need about 20 mA at least. R12 should be a little bigger than R14 so that the work is shared equally between the two halves of the 12BH7, with V2b doing a little more than its fair share. Finally, R18 and R4 control the feedback and hence the overall gain. We have plumped for a ratio 56/(100 + 56) , or about 1/3, giving an overall gain of 3 times, or about 9 dB. Because of the 6dB loss in the output this means the gain from input socket to output socket is +3dB, enabling us to set the gain control on the input to unity gain and have the chance of a slight boost to correct for cable losses, etc. The loop gain of the amplifier is the sum of the gains and losses of the individual stages; in this case, it is +26dB for the first stage, +33dB for the second, about -4dB for the output stage (since it's a cathode follower supplying a lot of current) and -9dB in the feedback loop, a total of 46 dB. This is a little high, but if one or both halves of the 6U8 are "low", we will probably get away with it ! (after all, what BATC members will have new 6U8s ?) If it's a problem, reduce the gain of, say, the first stage, by potting down from anode to earth, or better, by splitting R3 and taking C2 to the mid-point of the two resistors - or by putting 50Ω between V1a cathode and R4, still taking the feedback to the top of R4. All of these things I suggest pessimistically, just in case .....

Now switch on after checking connections, check that voltages are within 20% of those on the diagram, and look at the output. Put a signal into the input, correctly terminated. Terminate all three outputs ; this is essential. If this is inconvenient, short one output, leave one unterminated, and look at the third (unterminated) one. This gives the amplifier the same load as three terminated ones, which is what matters. On the prototype, when sawtooth was fed in, it appeared to "burst into flames" at the top, due to H.F. oscillation. This indicates a rising response, and could be controlled by adding C7 and C8 ; these will have to be found by experiment I'm afraid, but the impedances are fairly low so they should not be too critical. Decoupling the H.T. line is essential also, the more so if the leads are long ; hence C9 - value not critical. A small capacitor across R7 helps stability by improving the H.F. phase response through V1b, and a similar capacitor across R14 may make matters either better or worse. Decoupling R4 will probably make the amplifier go mad. If the amplifier is stable at H.F., meaning in this case that it doesn't oscillate between 15 and 40 Mc/s - the usual place - turn the gain control right up and right down to make sure its stable over the whole range. Even if you can't see an H.F. oscillation on monitor or receiver, you may see it on the CRO as a slow L.F. oscillation, a sort of "squeg". Proceed as for H.F. trouble.

Having got the thing stable, check D.C. voltages again to get exactly +125 volts on the 6U8 pentode anode, and adjust R8, R9 and/or R10 to get it right. It's important because of the D.C. coupling to V2a. On the prototype it was necessary to add R9 for this purpose. This voltage will depend on the particular 6U8 you have. If it's an old one, the voltage will tend to be high. When this is right, check for level at the output sockets. You should be able to get a volt comfortably at

Component List.

RV1	2.5K Lin.	R10	27K
R1	1Meg	R11	100 ohms
R2	100 ohms	R12	220 ohms
R3	8.2K 3 Watt	R13	100 ohms
R4	56 ohms	R14	120 ohms
R5	2.2Meg	R15,16,17	75 ohms
R6	100 ohms	R18	100 ohms
R7	68 ohms	C1	0.25 mfd
R8	12K 1.5 Watt	C2	0.5 mfd
R9	120K	C3	68 pF
V1	6U8	C4	16 mfd
V2	12BH7	C5	0.1 mfd
C8	3-30 pF	C6	125 mfd
C9	1 mfd	C7	22 pF

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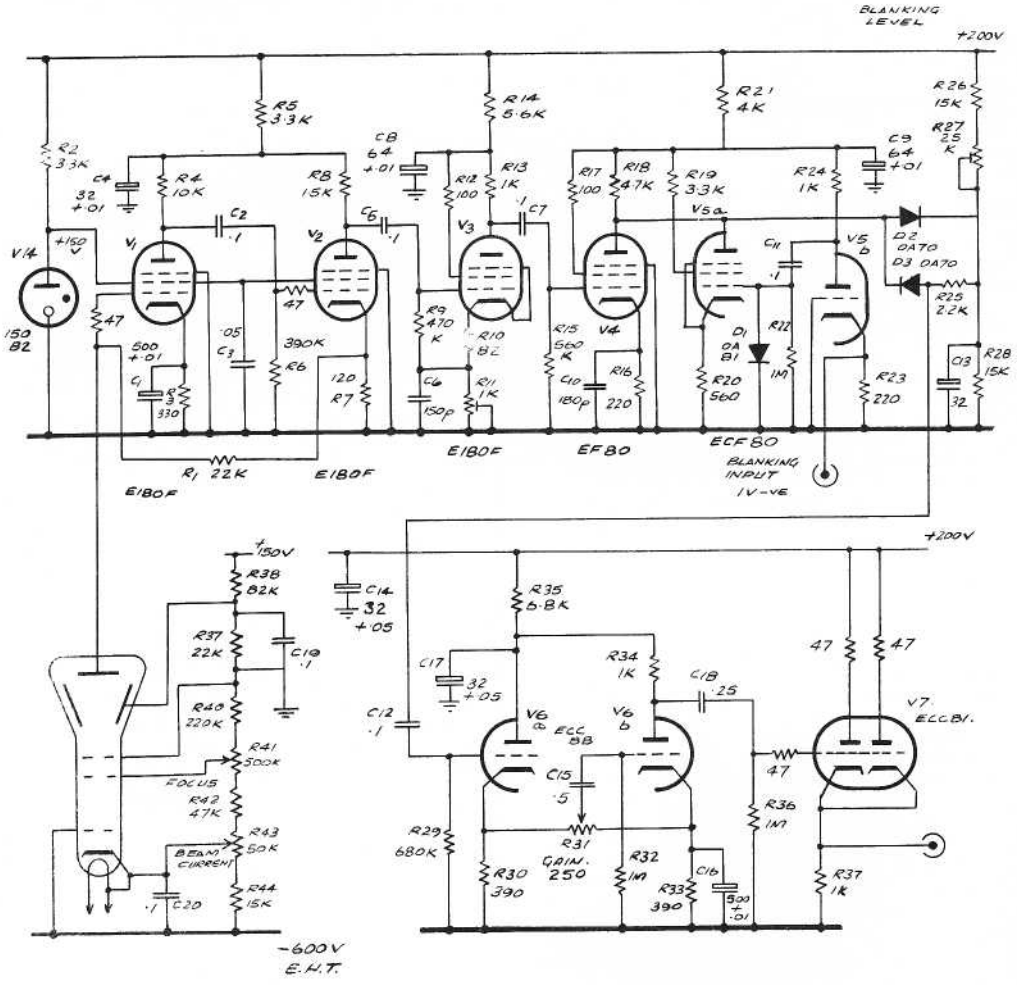
GRAHAM HILL'S MONOSCOPE



Although several other Monoscope cameras have been described in CQ-TV, this one appears because the results seen at the Convention were outstandingly good, and the circuitry uses some of the modern high slope valves. Although these are rather expensive in themselves, there are fewer required for the same output. Ed.

The equipment was designed to make the best possible use of the resolution capabilities of the Monoscope tube. However, to avoid too complex a video amplifier, peaking coils were avoided and the anode loads of the video amplifier valves kept low. To keep the number of stages down, the high gm valve, type E180F was used in the first three stages and in the gain control stage. To use the more usual types of valve a higher anode load would be required, together with the careful use of peaking coils.

The signal plate of the Monoscope tube is directly coupled to the grid of the first valve in the video amplifier, V1. In order to obtain a satisfactory signal to noise ratio a high value of load resistor must be used on the tube, to offset the loss in bandwidth, the output of V1 is fed back to the Monoscope load resistor, via the cathode circuit of V2. This reduces the effective value of R1. The unusually high value of anode load for V1 was found by experiment to give the best results. V3 is used as a high-peaker stage to correct for any HF loss not corrected by the feedback in V1, and for any other losses. At low frequencies the gain is low due to the large cathode impedance. However, at higher frequencies the reactance of C6 becomes significant, and lowers the impedance in the cathode circuit, thus increasing the gain as the frequency content of the signal rises. Adjustment Adjustment of R11 will vary the L.F. gain and the value of C6 determines the ratio of HF to LF gain, and should be adjusted to obtain the best HF response without overshoot. A value between 300 and 400 ohms proved best for R11.

At this stage the signal contains an output in the blanking period obtained during the retrace of the scanning beam. This is removed in the anode circuit of V4. Negative blanking pulses at standard 1 volt level are amplified by the grounded grid triode section of V5 and applied to the pentode section. During blanking periods V5b, normally conducting, is cut off and the voltage at the anode rises to a maximum determined by the voltage at the cathode of D2. When this voltage is reached D2 conducts and C13, 32 mfd, is connected to the anode of the video amplifier V4. At the same time D3 is cut off and the video signal developed across R25 is removed. By varying the voltage at D2 cathode, by means of R27, the blanking level may be set. During picture periods V5b is conducting and the anode voltage is reduced, thus cutting off V2 and allowing D3 to conduct so that the signal may be passed to the next stage. To compensate for the capacitive loading at the anode circuit of V4 and V5b, C10 is used to maintain the HF gain. Once again C10 is adjusted for best results.

V6 is connected as a gain control and phase reversing stage, the bottom end of the gain control being connected to the cathode of the second stage in order to remove DC from the control track. The two cathodes are maintained at approximately the same potential. The signal is then passed to the output cathode follower, V7 which delivers a blanked video signal at standard 1 volt level, ready for insertion of syncs in the station vision mixer.**

The E.H.T. Supply used is approximately 600 volts which is obtained by half wave rectification from the 450 volt winding on the mains transformer supplying the stabilised HT line. This E.H.T. is below the recommended 1000 volts for the tube but results indicate that it is adequate.

The final anode is given a positive bias in order to collect all the secondary electrons liberated from the target. This voltage is obtained by means of a potential divider from the 150 volts stabilised line.

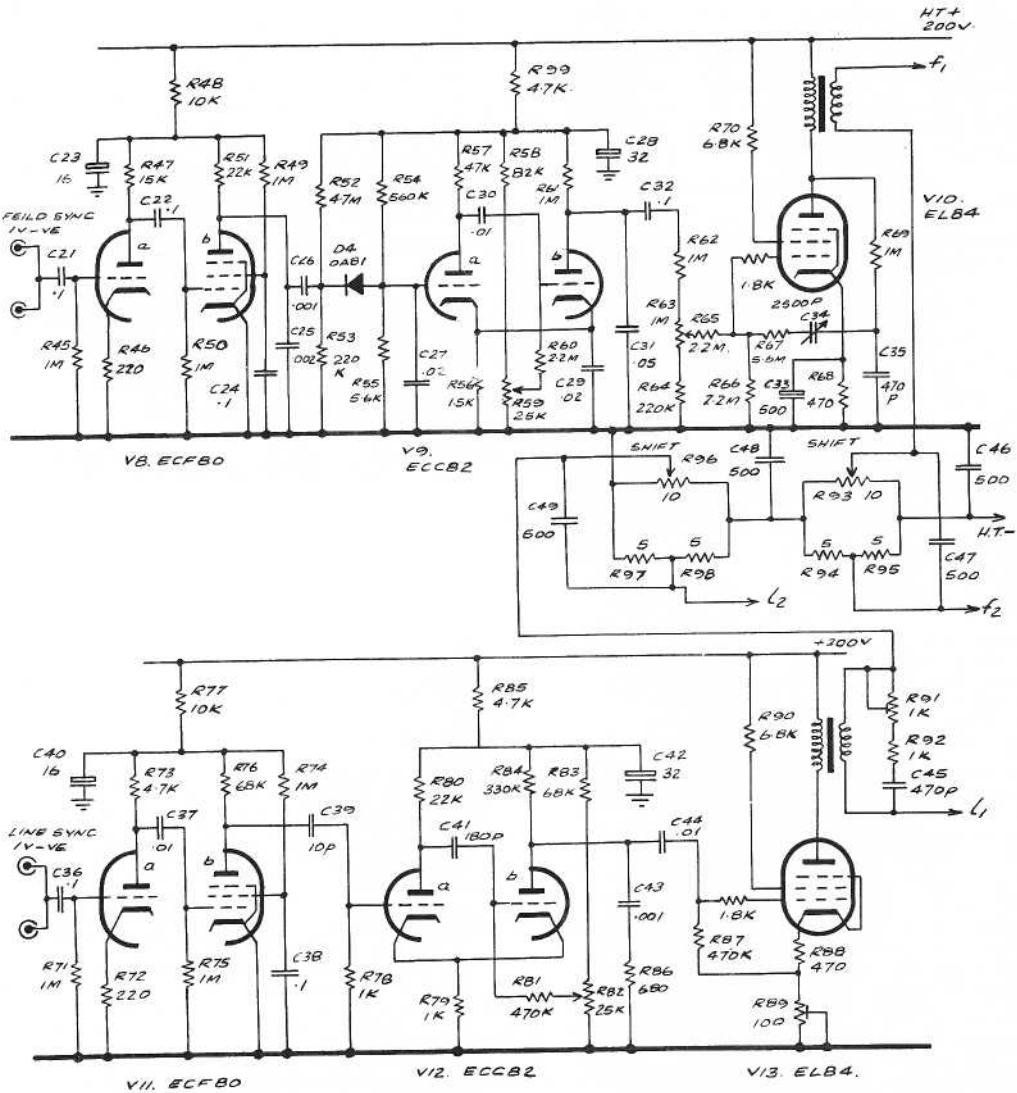
Timebases.

Each scan generator is quite straightforward and consists of a sync amplifier, limiter, cathode coupled oscillator and output stage. By using a sync separator for each timebase, a mixed sync signal may be looped through and used for triggering the oscillators, if separate line and field drive waveforms are not available.

Field Scan Generator. Field sync pulses at standard 1 volt level are amplified by the triode section of V8. The amplified output is ap applied to the pentode section which acts as a conventional sync separator and conducts at the sync tips. The waveform at the anode is integrated by R51, C25 and passed to the diode clipper D4, by C 26. Normally the diode is non conducting since the cathode potential, determined by R 52, R 53, is higher than the anode potential, determined by R54, R55. During the field sync per period the voltage at the anode of V8b, which is negative going, causes D4 to conduct so triggering the oscillator V9. After the field sync period the diode is again cut off, thus preventing line information upsetting the oscillator. The output from the oscillator is developed across C3 C31 and is passed via the amplitude control R63 to the output stage, V10. Linearity is corrected by the negative feedback network R69, C33,34 R67. By varying the time constant R67, C34, the overall linearity of scan may be adjusted. This is achieved by C34 (a Cyldon 2500pF pre-set) The linearity of the first few lines at the beginning of the field scan may be adjusted by varying the value of C35.

Line Scan Generator. Line Sync pulses are amplified by V11a, limited by V11b. and used to trigger the oscillator V12. The output of the oscillator is developed across C43, R86, the value of R86 being chosen to give best linearity. Scan amplitude is controlled by varying the cathode feedback resistor R89. Linearity is adjusted by controlling the damping across the scan coils thus linearising the first part of the scan. DC shift is obtained by passing the total HT current through the shift network.

*** Editor's note: This unit gives out a non-composite video, but the blanking - sync mixer may be modified as in CQ-TV 38, to give out a standard 1 volt composite video. Care should be taken to avoid turning up the tube beam without checking that scans are present.


HT+ 200V.
R48 10K
R99 4.7K
C23 16
R47 15K
R51 22K
R49 1M
R52 4.7M
R54 560K
R57 47K
R58 82K
C28 32
C30 .01
R61 1M
C32 .1
R70 6.8K
V10. ELB4
FEILD SYNC 1V-VE
C22 .1
C21 .1
D4 OA81
C26 .001
R62 1M
R69 1M
1.8K
2500P
C34
R63 1M
R65 2.2M.
R67 5.6M
C35
R45 1M
R46 220
R50 1M
C24 .1
C25 .002
R53 220 K
R55 5.6K
C27 .02
R56 15K
R59 25K
R60 2.2M
C29 .02
C31 .05
R64 220K
R66 2.2M
C33 500
R68 470
470 P
V8. ECF80
V9. ECC82
SHIFT
R96 10
C48 500
SHIFT
R93 10
C46 500
C49 600
H.T.-
5
5
R97
R98
R94
R95
C47 500
l_2
f_2
+300V
R77 10K
R85 4.7K
R90 6.8K
R91 1K
R92 1K
C45 470P
l_1
C40 16
R73 4.7K
R76 68K
R74 1M
C42 32
R80 22K
R84 330K
R83 68K
C37 .01
C39 10P
C41 180P
C44 .01
LINE SYNC 1V-VE
C36 .1
C43 .001
1.8K
R87 470K
R88 470
R71 1M
R72 220
R75 1M
C38 .1
R78 1K
R79 1K
R81 470K
R82 25K
R86 680
R89 100
V11. ECF80
V12. ECC82
V13. ELB4.

WHAT THE OTHER CHAP IS DOING

Arthur Critchley, or to be more precise, 3155586 J/T Critchley A.W. (Doncaster,Yorks.) writes with news of his staticon demonstration at the RAF Open Day. The chain ran continuously for 9 hours with no faults ; Mike Soames' SPG and RF units were in use. The camera was at one end of a hanger, to look in at the people or out at the aircraft. 50,000 visitors attended, and the pictures were shown on 3 21" and 2 17" sets. Arthur's camera resolves 2 1/2 Mc/s bars with no peaking coils ; the only snags are a streaky picture and verticals a bit wavy. Some useful points to remember when doing dems.: Rope off the entire equipment. Raise camera above the heads of annoying small boys ! Have super definition viewfinder. Lens irises are essential. TV sets used as monitors should NOT have APC or flywheel sync. Thanks for those handy points, Arthur.

News of progress in the Acton-Hayes(Middlesex) area comes from Dave Hooper, G3ICU. Dave is buried deep in his waveform generator and has the MO and frame counters working ; his staticon is working, but waiting for syncs. Dave's 70 cm gear includes a G3KOK converter working into a 38 Mc/s I.F., and an aerial is next on the list. Ron Smith G3JGV has his 70 cm rx/tx almost ready to connect to the aerial, and has the transformers ready to start work on his counter chain. He is trying projection CRT's for FSS work. Mick Cotter who won an EMI vidicon at the Convention raffle is winding his scan coils, and learning all he can about vidicon cameras

Many thanks to those who returned the RF 70cm questionnaires duly completed. As the Hon. Sec. dropped a clanger by not ordering enough forms to go out with all copies of CQ-TV 43, would those who hold /T licences and who have not already filled in and returned a form, please send in details of their frequencies, picture sources, schedules and any other relevant information. Simon Freeman G3LQR/T of Colchester can get a signal on 432 Mc/s to Chelmsford - can anyone receive him ? Ian Waters G3KKD (Ely) transmits on Saturday evenings on 434 Mc/s ; he has a regular sked with Jeremy Royle, G3NOX/T, 26 miles south. Mike Bryett, G3OAT/T, is a third active member of the East Anglian TV net.

Dave Hooper also mentions that D.Nichols, 168 Ferrymead Avenue,Greenford, Middlesex, will make studio lamps at 45/- each less bulb. The lamp stands on three rubber tipped feet and is adjustable from 4' to 6' ; the lamphouse will tilt and pan, and takes a 150W bulb, bayonet or Edison screw. Mr. Nichols will also make one offs of small metal parts, chassis, etc. Good luck with the Hayes-Acton link, Dave.

We are very sorry to learn that Pat Clampin, the efficient secretary of the Brentwood group, has met with an accident, and may be in hospital for some months ; all the very best for a good recovery. Brentwood group now have a couple of TV sets in working action for use as monitors.

Dennis Wheaton, VK2AWW/T, NSW, Australia, has been publicizing BATC in the Australian journal Amateur Radio - thanks for your help, om. Keep an eye on Amateur Radio ; about a year ago, there was an excellent series of articles on amateur TV by our member Eric Cornelius WK6EC. It is splendid to hear from Ian Kennedy, Salisbury Southern Rhodesia ; he achieves good results with his FSS, using 3FP7 and 931A. Ian is also building a 5527 iconoscope camera, and taking out a /T licence. His standards are similar to those proposed for the S.Rhodesian service : 625 line FM sound, but he will be using sequential scanning. Any comments about the value of interlacing for amateur TV ? (That should stir it!) Good luck out there Ian, and let's have news of the iconoscope.

RAF Locking group is pressing on with the 6J6 transmitter, despite the loss of their UHF expert (complete with their circuit!) The video side is going better, but monitors are a problem. A surplus Loran unit is the basis of their pulse generator.

A welcome tape letter has arrived from Michael Bues, Epsom Downs. his FSS uses 5FP7 and 931A, with video strip E180F, EF91, EF91 and 12AT7 o/p stage, giving a positive or negative picture. His 70 cm tx is nearly completed ; he uses a 6J6 Squire oscillator ; 5763 to 72 Mc/s ; 5763 to 144 Mc/s ; then to an 832 tripler tuned to 70 cm. This drives a QQV06/40. The modulator will probably use EL81. Michael has a fine QTH way up on the Downs. He is working with Stan Crouch, G3MSN/T, Tolworth ; Stan has completed a sync blanking generator and mixer from CQ-TV circuits. As he is in the forces at present, there isn't much spare time, for ATV. Michael would be pleased to swop tape letters on amateur TV with any other members. Dicky Marshall (Harpenden, Herts) has a couple of beefy 500-0-500 volt mains transformers for disposal - anyone interested ?

Michael Pittam G3NWA/T of Wolverton, Bucks. has not had any spare time for TV recently, but will be active by winter. He is in touch with K.J.Field of Olney, Bucks, and A.W.Harris, Leighton Buzzard. Good news from Frank Nolan, VK4FN/T of Queensland : he is active once again after having been on the sick list for 9 months. He is building his gear to Australian standards, using vestigial sideband. Martin Coyne, Eire, who is building a vidicon camera, has built himself a coil winder to deal with the scan and focus windings.

Dave Jones G3LYF/T of Devon has a good RF view of the Dorchester area. He possesses a tape recorder and works professionally on valve application reports, so is willing to lend a hand with valve enquiries. He gave a talk to the Torbay amateur radio club in July, which aroused some local enthusiasm. Gordon Sharpley G3LEE and Brian Green G3KCB of Manchester are busy transistorizing some gear - and thinking about low noise vidicon pre-amps.

Grant Dixon is now well equipped for 70 cm reception, complete with rotary beam aerial. He is in touch with Jack Byrne G2AFD of Malvern, and Malcolm Sparrow, G3KQJ/T, of Wolverhampton ; and has also picked up strong signals on 70 cm from G3HAZ, 44 miles away. Grant sends a plea for more 70 cm transmitters to be beamed at Ross-on-Wye ! Tony Young, Bushey, Herts., is building a transistorized SPG to give 405 lines. He uses multivibrators to count down from 20,250 to 50 c/s, and has not run into any snags so far. He requires a circuit for the shaper unit - is anyone else building a transistorized pulse generator ? The latest Ferguson one (switchable to three standards) costs £1500, so there is plenty of scope for amateur work in this field!

George Russell W2SJU of New Jersey has been collecting information on closed circuit TV equipment. He considers the three vital points to be simplicity, flexibility and low cost ; of course, this applies equally well to industrial TV gear and to amateur gear. The cheapest camera lists at about $600 complete, using any TV receiver as a monitor. W. Thacker of Burwell Cambs. was delighted to win an EMI photomultiplier in the Convention raffle, as he has been recently experimenting with a FSS system. The MW6-2 was found to have too long an afterglow, so he is using the 5FP7 as scanner.

We were very sorry not to see the High Wycombe group exhibiting at the Convention this year ; they had run into a few troubles in winding the coils for their staticon, but should be making progress by now. I. Miles, who recently joined the R.N. based at Cornwall, asks for references to books dealing with J.L.Baird's work - can anyone assist ? Lewis Elmer, home town Warrington Lancs, is now in the forces, at Portsmouth. He has built a 70cm converter and would like to collaborate with anyone in the area who owns a transmitter. B. Whitty, of Liverpool, is working on a flying spot scanner. We have about a dozen members in the Liverpool area, so look forward to more news from the North.

It was good to see Derek Whitehead at the Convention ; he had travelled from the arctic via Montreal and was able to collect a tape message from Mike Barlow. When he is at home, in Llandudno he and John Lawrence GW3JGA/T of Prestatyn run a two way vision link. Derek will be home for a couple of months next year, so there should be plenty of activity.

SLOW SCAN CORNER

There is now so much activity and interest in slow scan TV that Pluff Plowman suggests a separate corner for SS news. To those who are tired of reading about SS, may we point out that the remedy is in your own hands : let's hear more of colour, FSS, cameras, RF, aerial arrays, etc.

Don Miller W9NTP of Waldron, Indiana, sends news of SS from the states : quite a number of amateurs are active, inIndianapolis, and are collaborating with Cop Macdonald WA2BCW in Elmira, N.Y. They find that electrostatic CRTs are too expensive, and consequently are using electromagnetic tubes. Ron Geere writes in to state that SS TV is too slow for recording even slowly moving objects, and he is working on a scheme for "fast" slow scan (curses, I can't abbreviate it to FSS !) in order to record cartoons or moving images. The scheme is only intended for tape use, and thus full advantage is taken of the available pass band of some 16 Kc/s. Ron proposes a scheme of 64 lines, a line frequency of 250 c/s and a field frequency of 16 2/3 ; an interlace of 5 times is provided and a readout time for one frame is 0.3 second. One of Ron's picture problems will be distortion of the image due to motion occurring whilst the frame is being synthesised. Most of the schemes so far envisaged are being transistorised. The best of luck with your experiments Ron, and keep us posted.

News from G3AST is somewhat brief this time due to pressure of work ! Since he returned from the Convention,however, he has improved the video amplifier of the scanner unit on display there. The dotting oscillator frequency has been raised to 15 Kc/s and the coupling time constants drastically reduced in the video amplifier. The Cockcroft-Walton voltage doubler circuit has been removed and replaced by a phase splitter feeding a full wave diode rectifier. Response times have been improved and the picture quality is materially better than that demonstrated at the Convention. The remaining big problem with the scanner unit is now an optical one and considerable trouble is being experienced at the present time from flare and halation caused by glossy postcards. G3AST is experimenting with a diffuse light sources to overcome the snag.

Further North, Gordon Sharpley, G3LEE and Brian Green, G3KCB of Manchester, have been attending exhibitions and demonstrating SS TV. They represented the BATC at the Institution of Electronics Exhibition in Manchester in July.

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V.D.A. Concluded...

each before limiting starts ; when it does start, it will clip solidly, especially at the bottom. If you can't get at least 1·2 volts, check that V2 current is over 22 mA, and if necessary adjust R14. Finally, if still unsatisfactory, feed in sinewave (50 cycles will do) and adjust R12 until, when the output level is turned up, it limits on top and bottom simultaneously.

L.F. response should give no trouble, because of the massive feedback; but check that there's no more tilt coming out than going in. The output impedance should be about 0·5Ω at C6, so it is essentially as accurate as R17, R16 and R15. If they are 2%, the output impedance will be within 2½ % of 75Ω. What more could you want ? Finally, any unwanted signal appearing on one output is potted down in the ratio 75Ω to 0·5Ω, or 150 times, before it can get on to any of the other outputs with a further 6dB of loss - this means at least 40 dB of isolation between outputs, so long as they are correctly terminated.

The prototype of this VDA was shown at the Convention.

And now it's about time this article was terminated, in 75Ω of course.